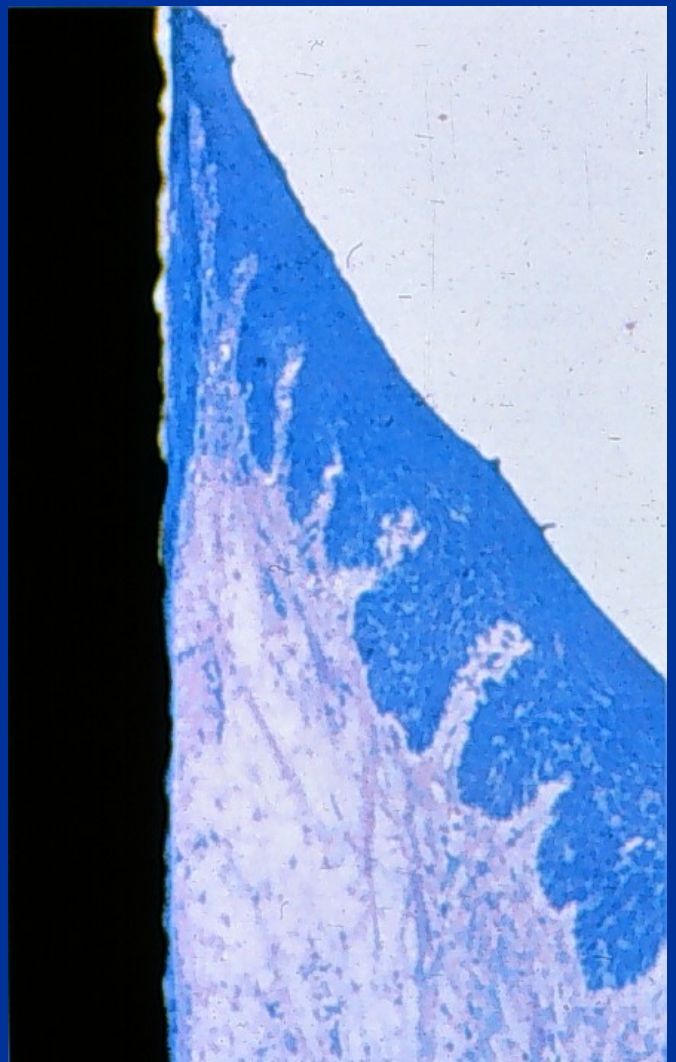
Implant Maintenance
and Repair

Implant Maintenance and Repair

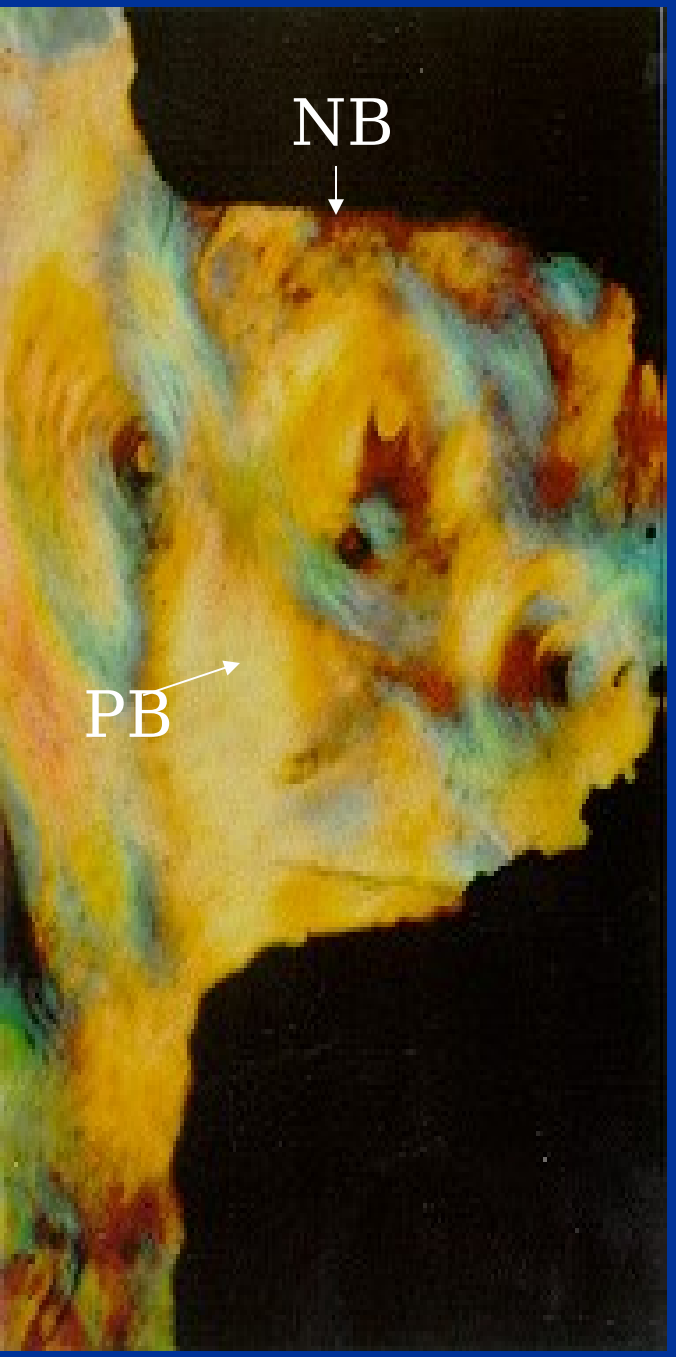
- **The purpose of this presentation is to provide the basic knowledge to perform proper maintenance and minor repairs to patients that have been restored with dental implants.**
  - **Slides 1 thru ## are a basic introduction providing essential information when performing an evaluation on an implant patient.**
  - **Slides ## to ## identify the materials and methods to performing proper maintenance check - ups.**
  - **Slides ## to ## describe clinical situations that may present themselves. Diagnosis through treatment is emphasized.**

Implant - Soft Tissue Interface



Healthy

- Normal gingival architecture
- Minimal inflammatory infiltrate
- Connective tissue closely adapted to the implant



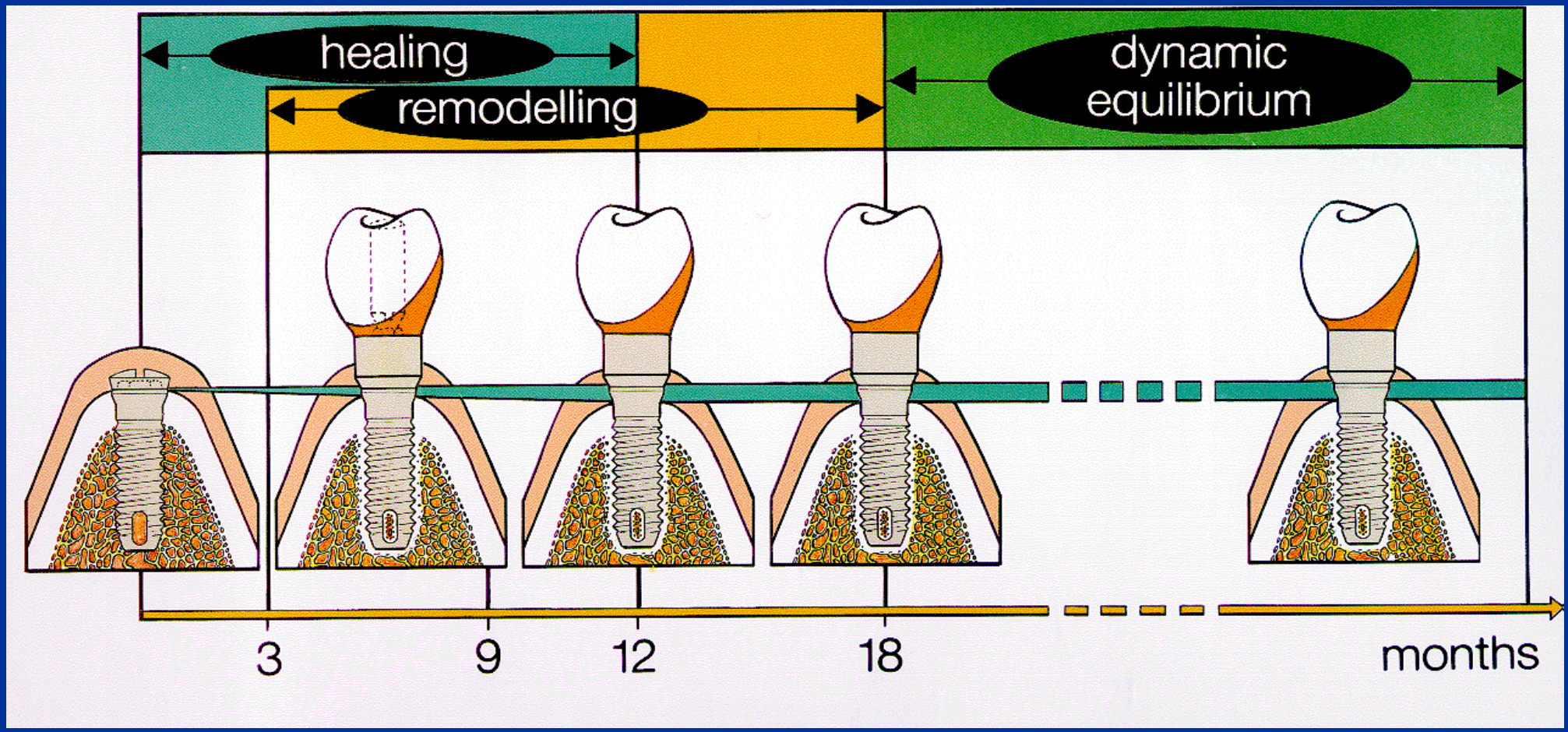
Bone Maturation

- **Pre-existing bone (PB) extends into threads providing stability.**
- **New Bone (NB) in close apposition to the implant**
- **New Bone deposition approximately 1um/day**

Osseointegration

- Dynamic process
- Healing phase: 0 - 12 months
- Remodeling phase: 3 - 18 months
- Steady state: 18 months ---

Osseointegration
a dynamic process



Components of an implant restoration

- Screw retained implant restorations consist of three components.

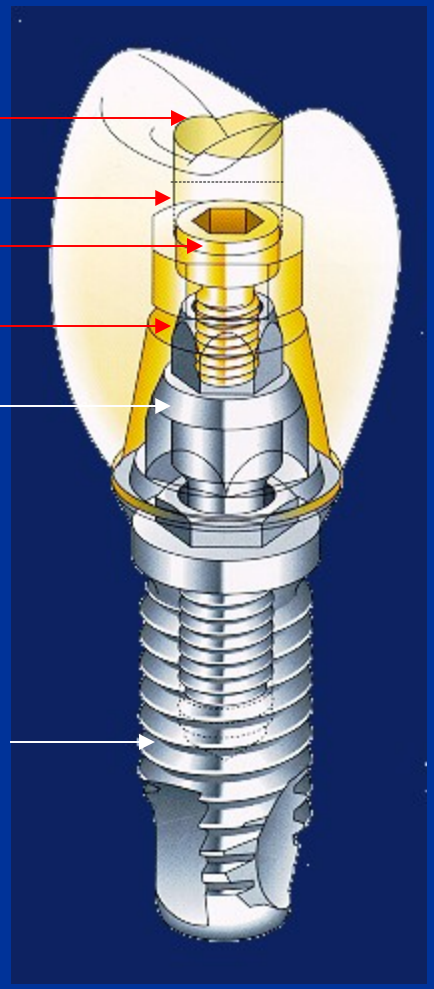
  (a) implant fixture

  (b) abutment

  (c) restoration

- the abutment screw secures the abutment to the fixture

- the prosthetic retention screw secures the prosthesis to the abutment.



Abutment

(Screw retained restoration)

- can be either parallel (standard) or conical (estheticone) in shape.

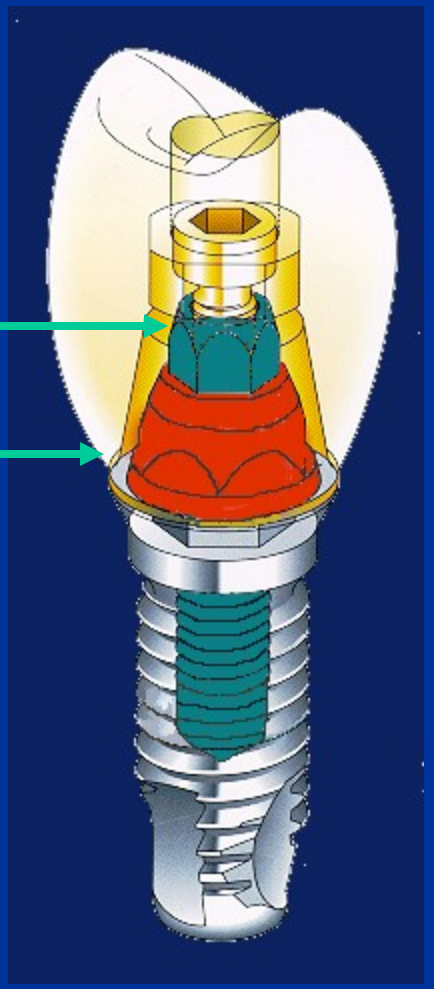
- are secured with an abutment screw that is tightened to 20 Ncm.

Abutment

(Cemented restoration)

- Cera One abutment

- secured with a square head screw tightened to 32 Ncm.



Prosthetic retaining screw

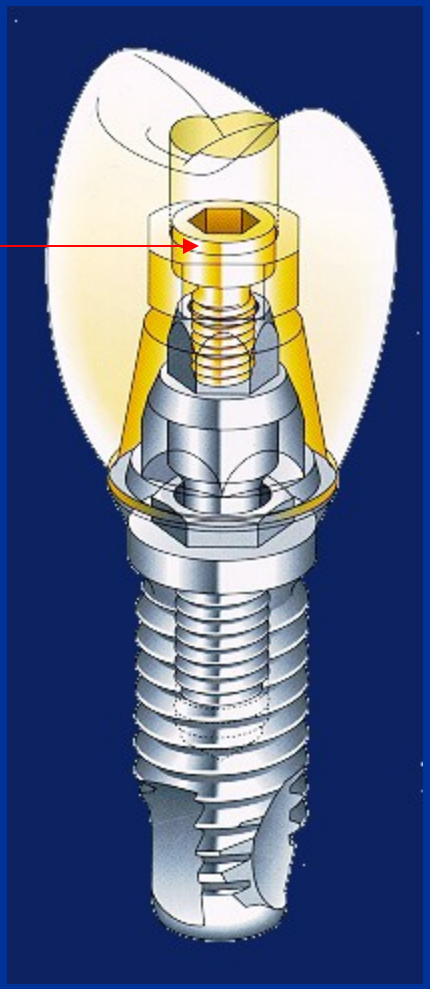
- can have a slot or hex head

- access is usually covered by a combination of gutta percha and composite.

- used to retain the prosthesis to the abutment.

- tightened to 10 Ncm.

Retaining screw

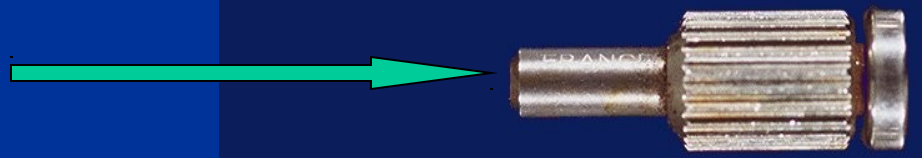


Hand Screw Drivers

Prosthetic retention slot screw driver

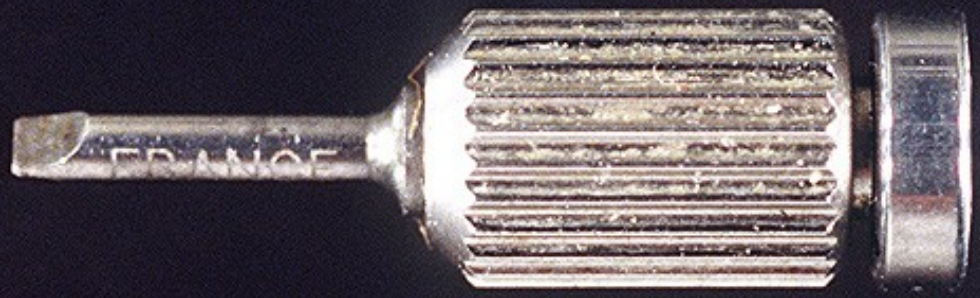
Prosthetic retention hex screw driver

Hex Abutment driver
Standard and conical (estheticone)



Square abutment
Gera One or square driver
abutment screws

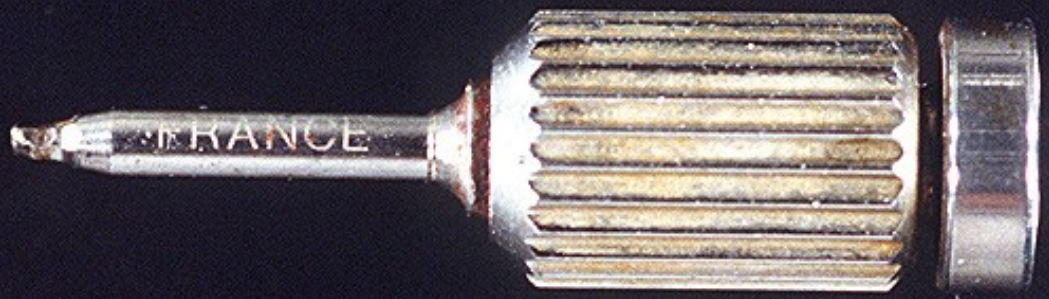
Slot Screw Driver



- Used to remove or replace slotted prosthetic retention screws.

- Tighten to 10 Ncm

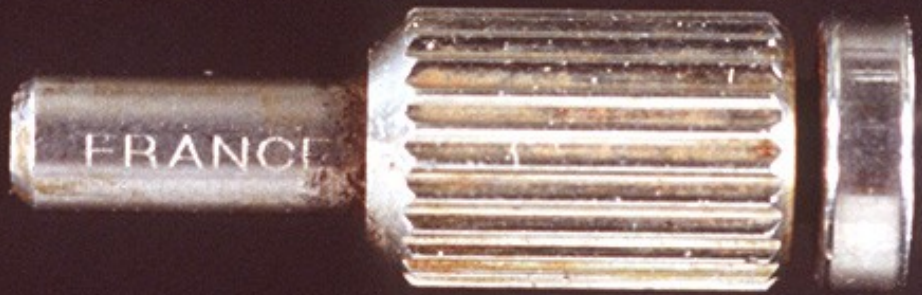
Hex Screw Driver



- Used to remove or replace hex prosthetic retention screws.

- Tighten to 10 Ncm.

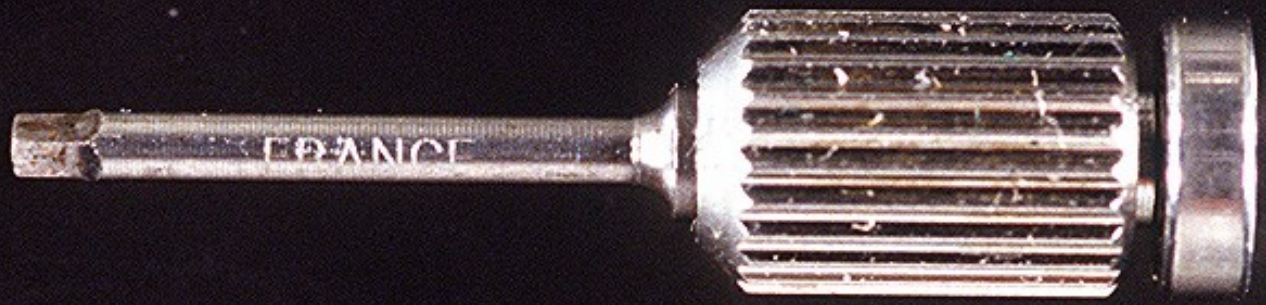
Abutment Screw Driver



- Used to remove or replace abutment screws for standard or conical (estheticone / mirus cone) abutments.

- Tighten to 20 Ncm.

Square Screw Driver



- Used to remove or replace Cera One abutment screw.

- Tighten to 32 Ncm

Maintenance and Recall

- **Annually**
  - **periapical radiographs should be taken to monitor the crestal bone levels. (crestal bone can be at the level of the first thread in one year with 0.1mm continued loss to approximately 1. 5 mm total bone loss)**
  - **remove and reinsert screw retained implant prostheses every 2 years unless indicated otherwise.**
    - **Replace prosthesis with new retaining screws if removed.**
  - **Cemented restorations are usually permanent (nonretrievable).**
  - **Recall focus**
    - **Occlusion - verify there are no excursive contacts. Should not hold shimstock. Better to be out of occlusion**
    - **Oral hygiene - same requirements as for natural teeth.**
    - **Soft tissue health - periodontal probing for evidence of disease.**
    - **Screw joint torque - check for loosened screws (most common problem).**
    - **Integrity of attachments - applies to overdenture / overpartials.**
    - **Stability of implants - must be stable (non mobile) to be successful**

Maintenance and Recall

- **Screw retained prosthesis**
  - **Remove prosthetic retention screws**
    - **Screw access holes are usually sealed with a layer of cotton pellet, silicone plug or gutta percha the acrylic or composite resin.**
    - **Expose the screw by drilling carefully through the resin.**
    - **Remove the screw (slot or hex) with the appropriate screw driver.**
    - **Throat drapes are highly recommended.**
  - **Check for implant mobility and retorque abutments to 20 Ncm. (hand tighten as much as possible with finger abutment driver if no torque control device is available)**
  - **Clean and polish abutments (Do not remove)**
  - **Reseat restoration using new gold retaining screws.**
    - **Tighten screws as if doing nuts on the lugs of an automobile - place all screws back with minimal torque. Then work back and forth across the arch until all are tightened to 10 Ncm. (hand torque with appropriate hand screw driver if no torque controller is available)**

Maintenance and Recall

- **Screw retained prosthesis (cont.)**
  - **Temporary reinsertion**
    - **fill access holes with small cotton pellet and polyvinylsiloxane impression material or putty.**
  - **Long-term reinsertion**
    - **fill access hole with small cotton pellet over the head of the screw, followed by warm gutta percha and only 1-2 mm of acrylic or composite resin.**
- **Cemented restorations**
  - **Single unit**
    - **usually nonretrievable and not removed for maintenance.**
  - **Multiple unit (usually not indicated)**
    - **carefully tap off with crown remover, check for mobile implants and retorque abutment screws.**
    - **Replace restoration with provisional luting media, and recheck occlusion.**

Hygiene Aids

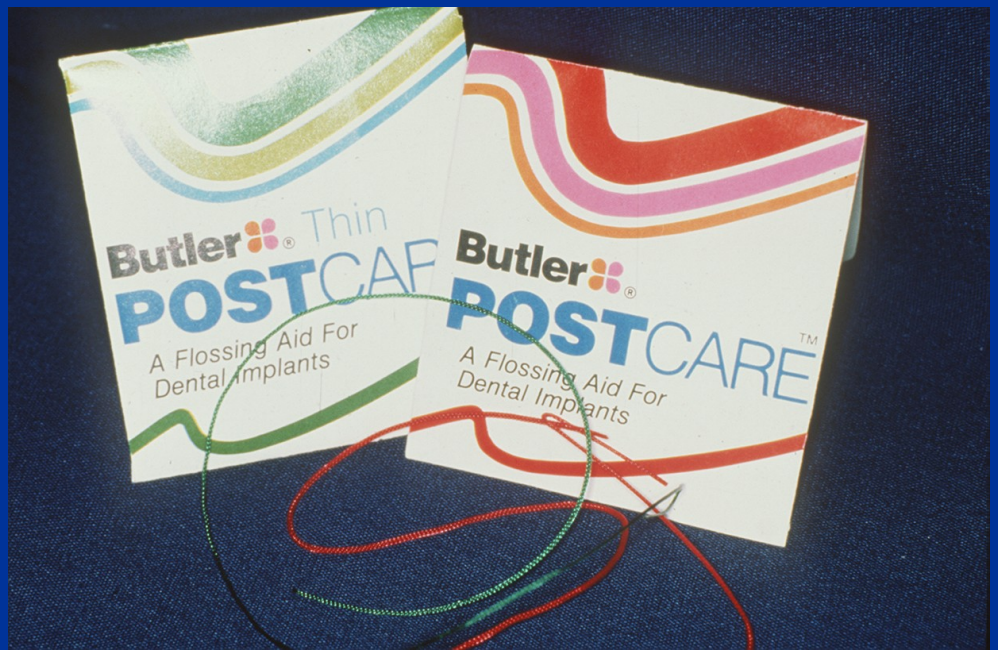
- Super - floss
- End tufted brushes
- Proxy brushes
- Tarter control dentrifices
- Mechanical instruments
- Peridex

Super - Floss

- Excellent for all types of implant restorations

Butler Post Care Floss Aid

- Excellent for implant bars and fixed hybrid prostheses.

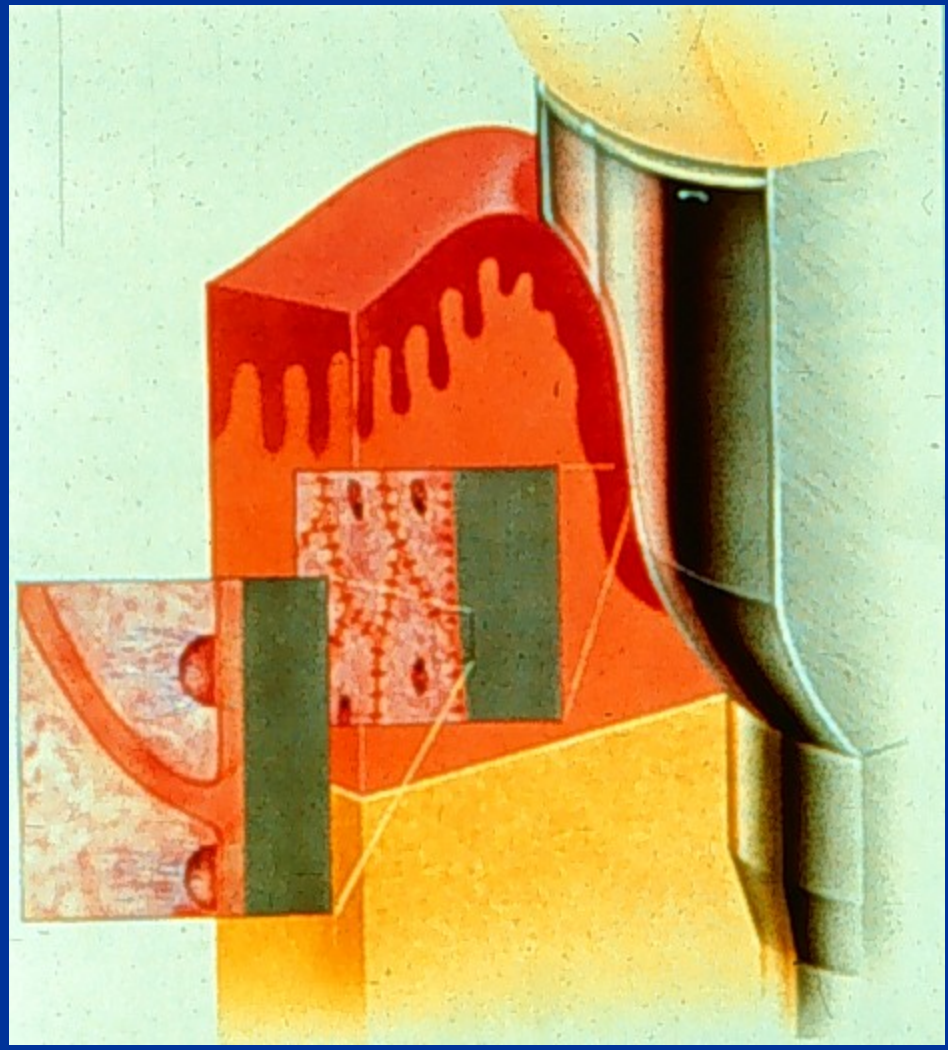


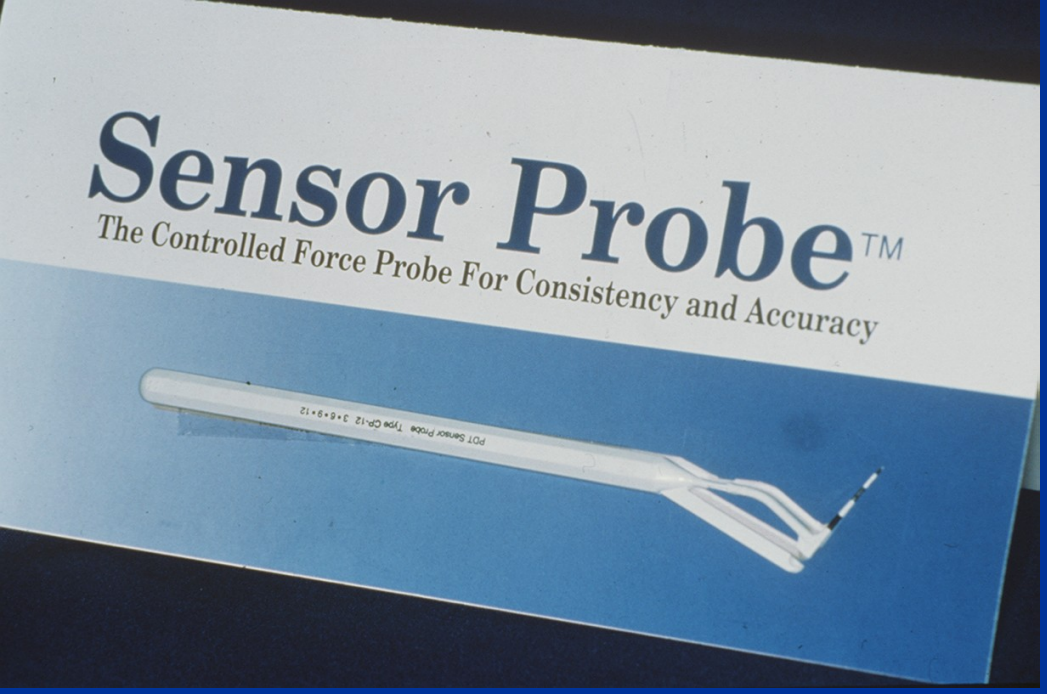
Fixed Hybrid Prosthesis

- Hygiene care with

Soft Tissue Relationship

- Similar to teeth
- No Sharpeys fibers
- Hemidesmosomal attachments
- Circumferential and perpendicular connective tissue

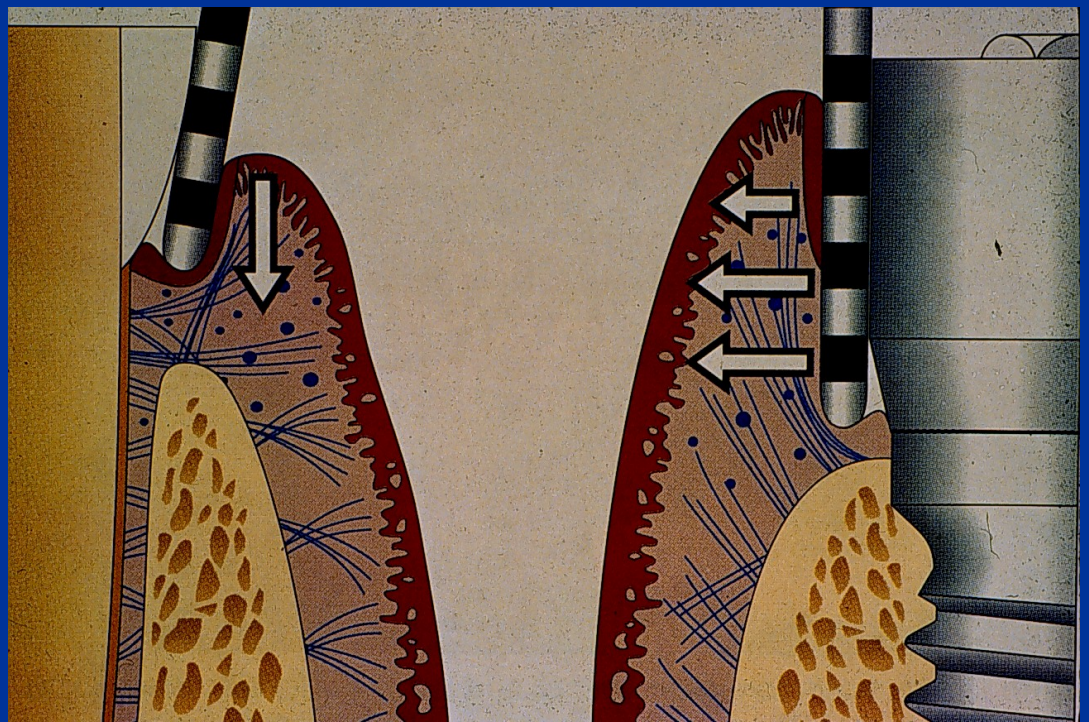


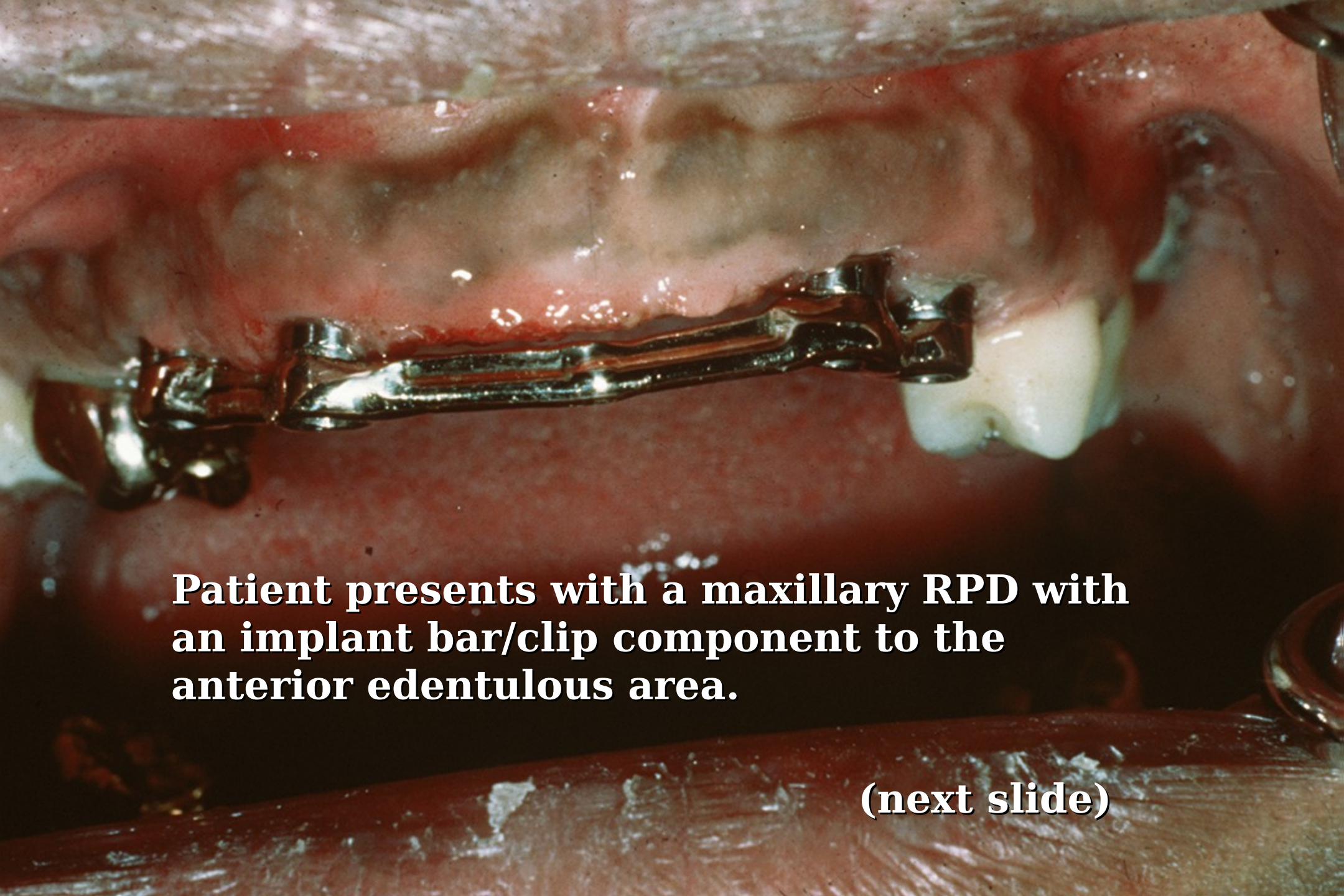


Plastic probes are used when checking for evidence of disease.

Implants are similar to the natural tooth.

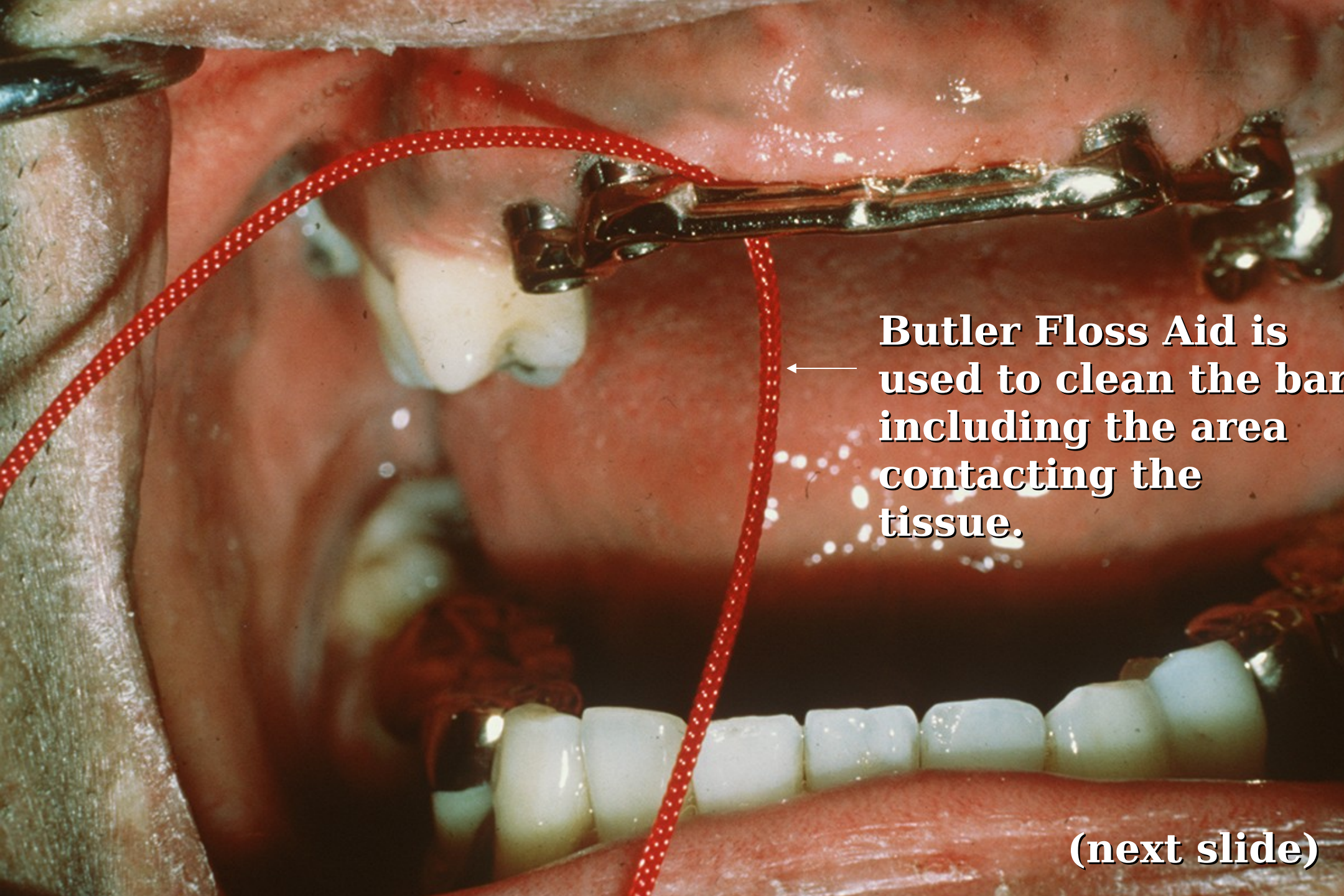
Implantitis vs. Periodontal disease have similar clinical presentations





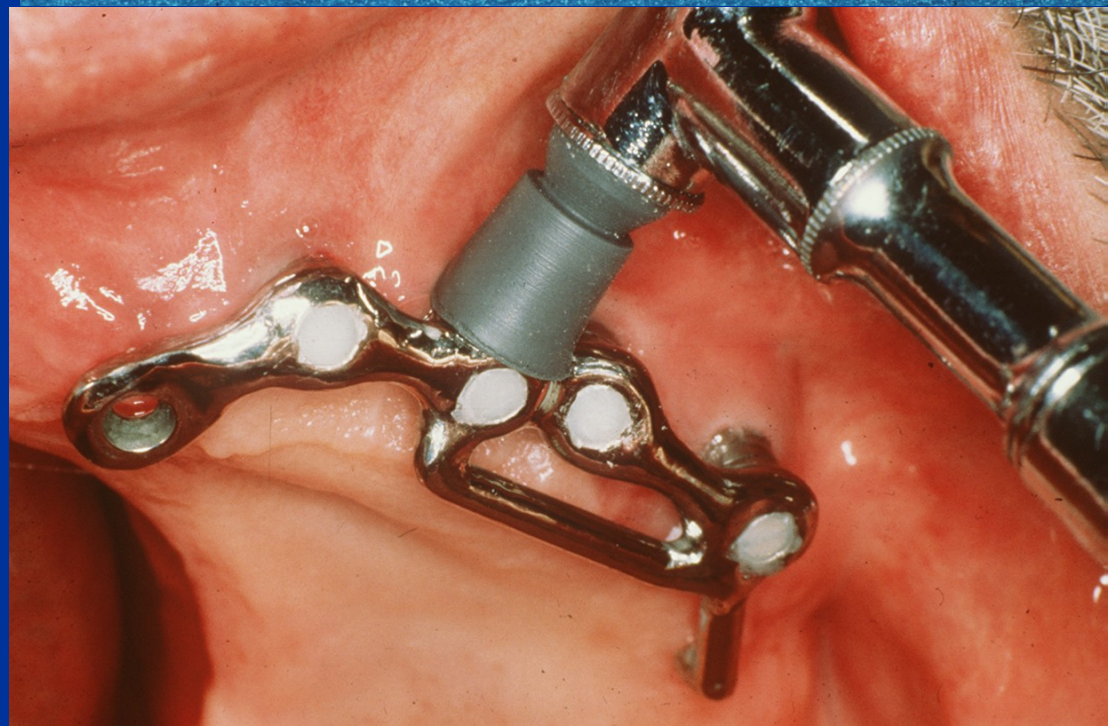
Patient presents with a maxillary RPD with an implant bar/clip component to the anterior edentulous area.

(next slide)


Butler Floss Aid is used to clean the bar including the area contacting the tissue.
(next slide)

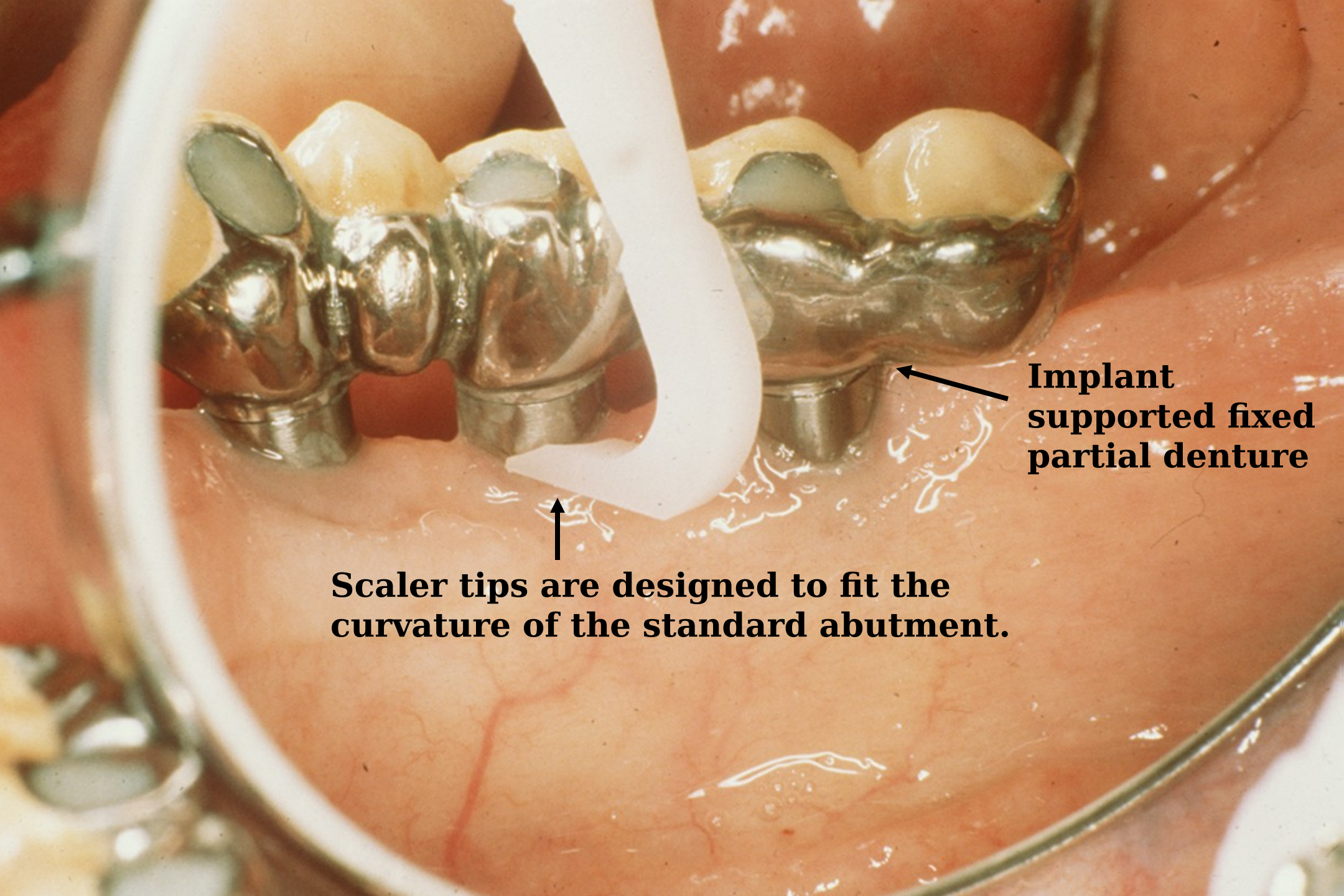
The bar may be removed with the appropriate screw driver, polished and the torque of all the abutments checked prior to replacement.

Prophy paste and a rubber cup on a prophy head / handpiece can be used to polish implant bars when removal is not indicated



Plastic scalers are appropriate for cleaning around standard abutments supporting implant bar substructures, hybrid prostheses and implant supported splinted restorations.

Plastic scaler tips are also available for metal handle scalers.


Implant
supported fixed
partial denture
Scaler tips are designed to fit the
curvature of the standard abutment.

Problems in the field

- Fractured/loosened screws
- Fixture loss
- Poor oral hygiene
- Soft tissue reactions
- Broken attachments
- Fractured components

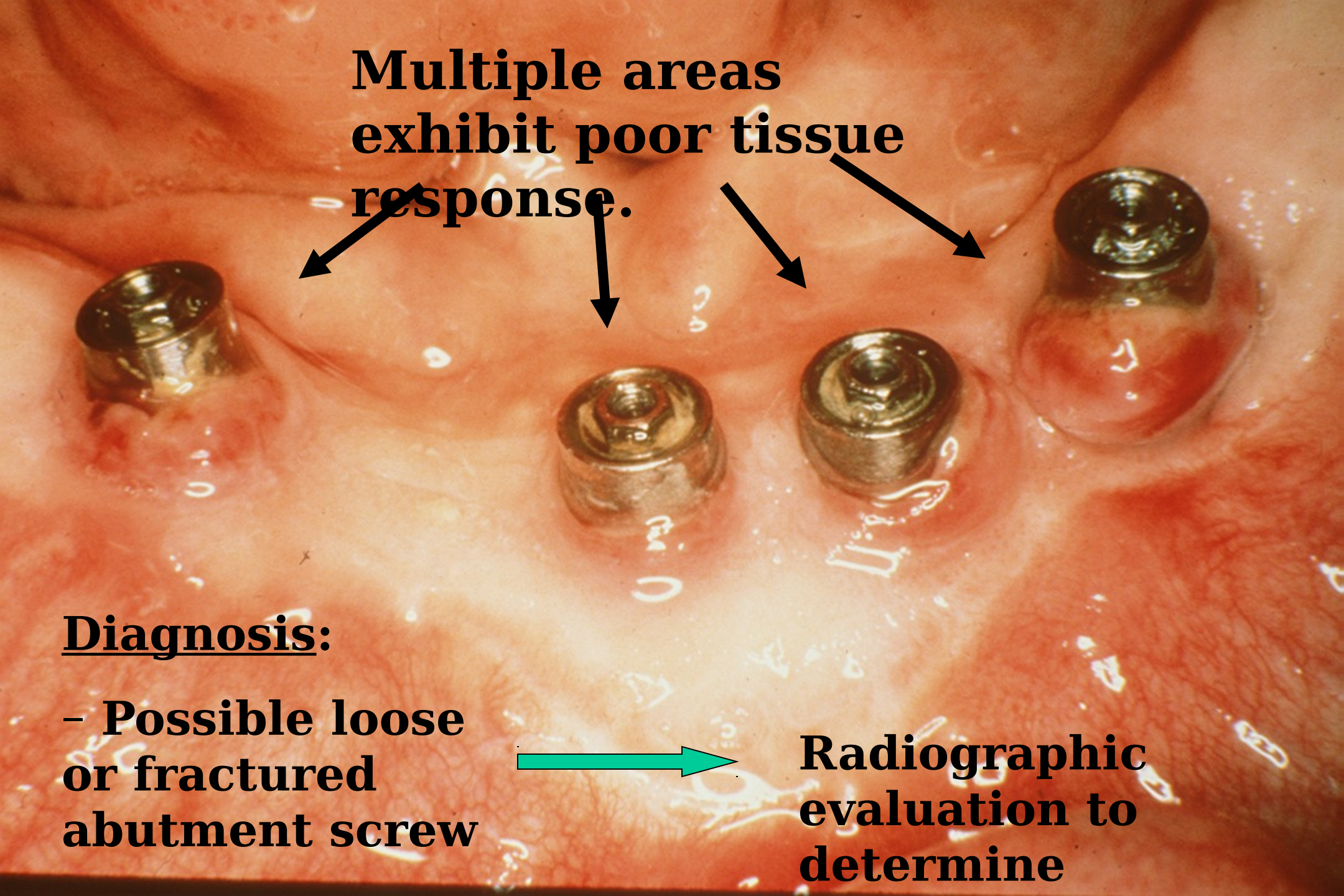
Problems in the field

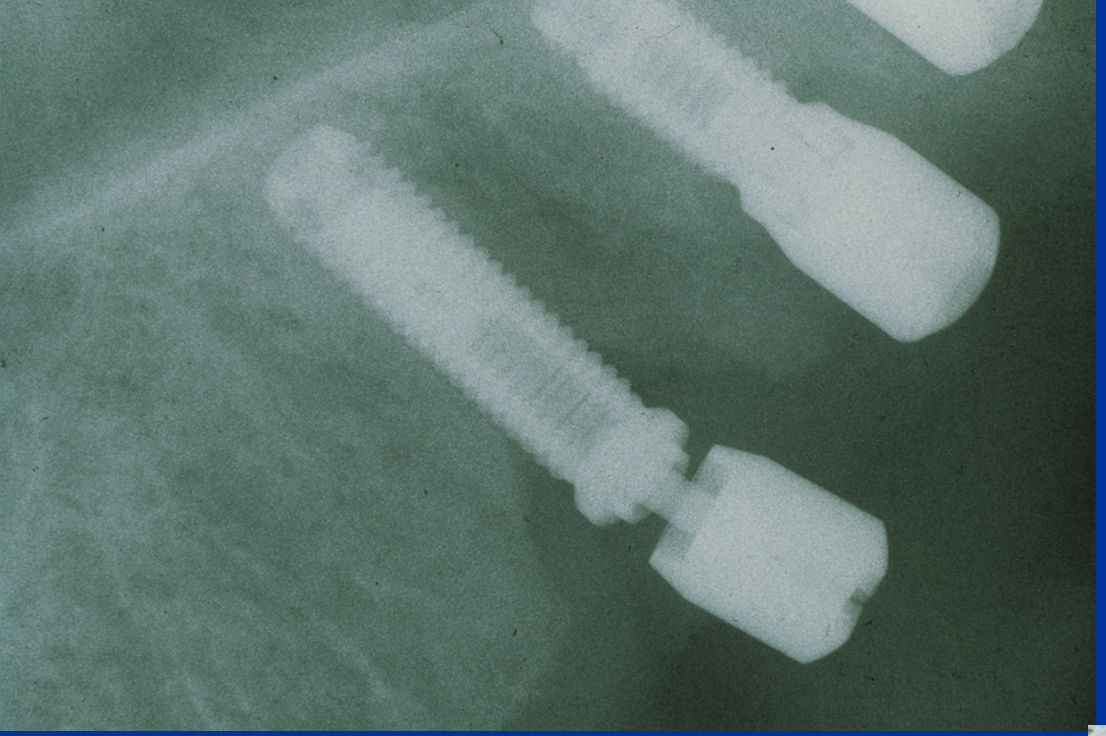
- **Fractured/loosened screws**
- **Fixture loss**
- **Poor oral hygiene**
- **Soft tissue reactions**
- **Broken attachments**
- **Fractured components**

Fractured or loosened screws

- Usually results in localized inflammation, loose restorations and discomfort.
  - First suspicion when patient complains of discomfort or loose implant.
- Prosthetic gold retaining screws have either a slot or hex head.
- Abutment screws require a hex abutment driver, large slot, hex or square driver.
  - Standard and conical (estheticone) abutments have a raised hex and require a wrench that fits over this hex.
  - All other abutment screws have the slot, hex or square depression inside the screw head.
- Loose single tooth abutments are true emergencies. Continued rotation can risk rounding the corners of the hex on the implant, causing a loss in anti-rotation.

Tissue appears swollen and edematous


Multiple areas exhibit poor tissue response.
Diagnosis:
– Possible loose or fractured abutment screw
Radiographic evaluation to determine



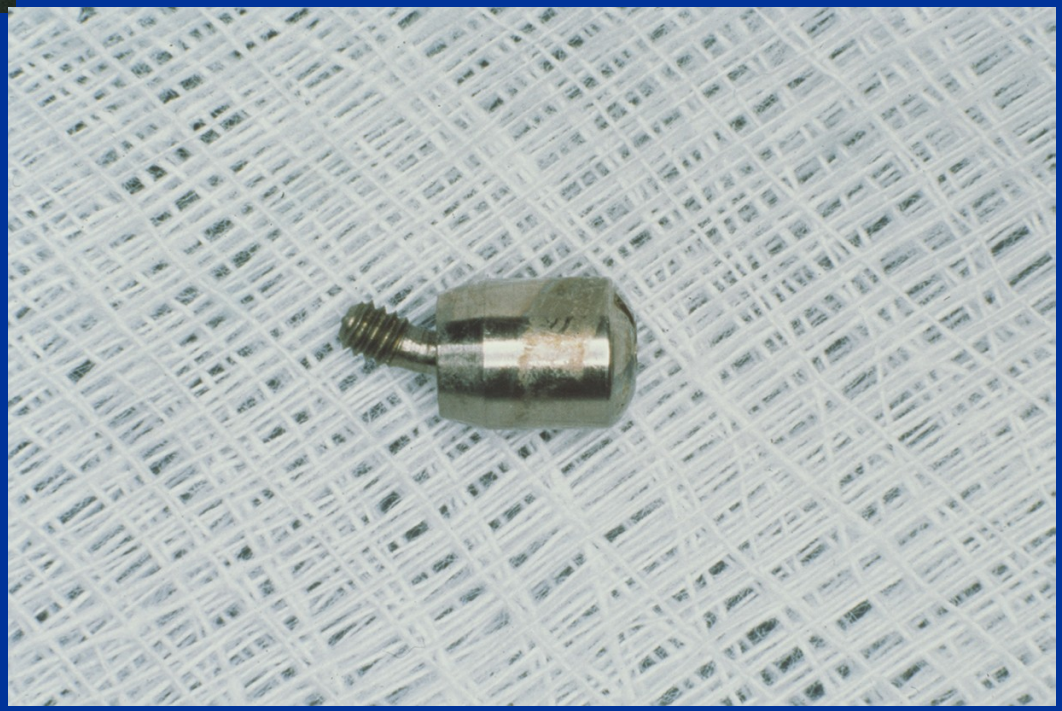
Initial Presentation:
Loose Healing Abutment

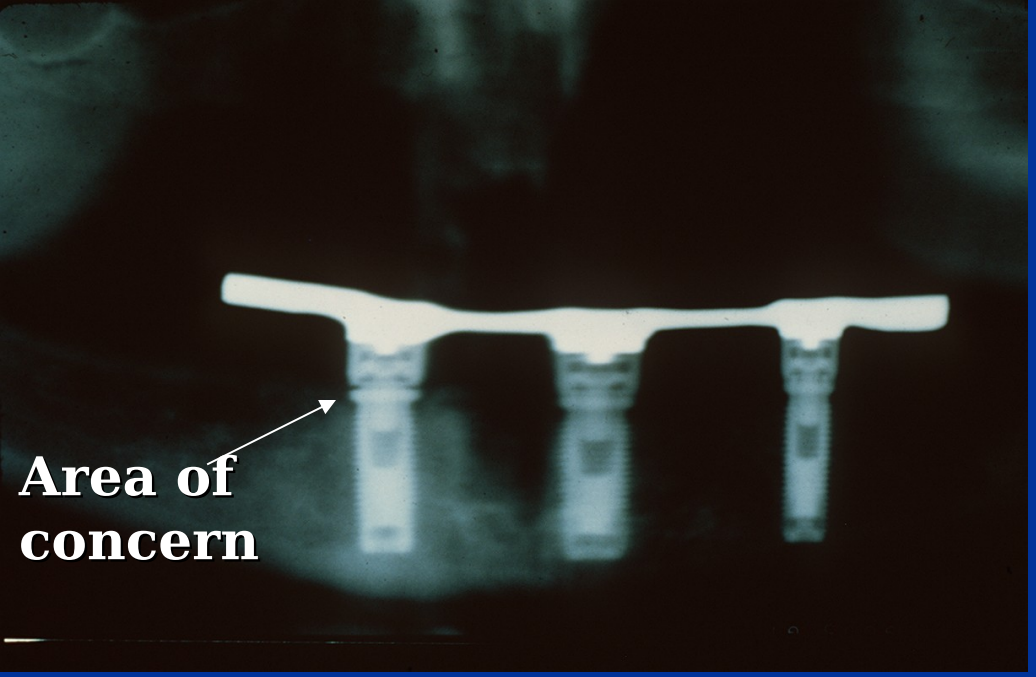
Radiographic evaluation of a loose healing abutment.

Removal of healing abutment indicates a distorted screw

Treatment:

Replace with new healing abutment





Initial Presentation:
Loose bar

Radiograph confirms poor seating abutment.

Diagnosis:

- possible loose or fractured abutment

Clinical evaluation after removal of bar indicates loose abutment screw.

Treatment:

1 - Retorque abutment screw

Abutment screw driver.

Treatment: continued

2 - Abutment screw is tightened with abutment driver.

3 - Bar is then replaced and prosthetic screws are torqued

Clinical Exam: Loose restoration

Radiographic Evaluation: Small opening at abutment-implant interface

Diagnosis:

- Loose abutment screw

Treatment:

1 - Loosen screw and remove restoration

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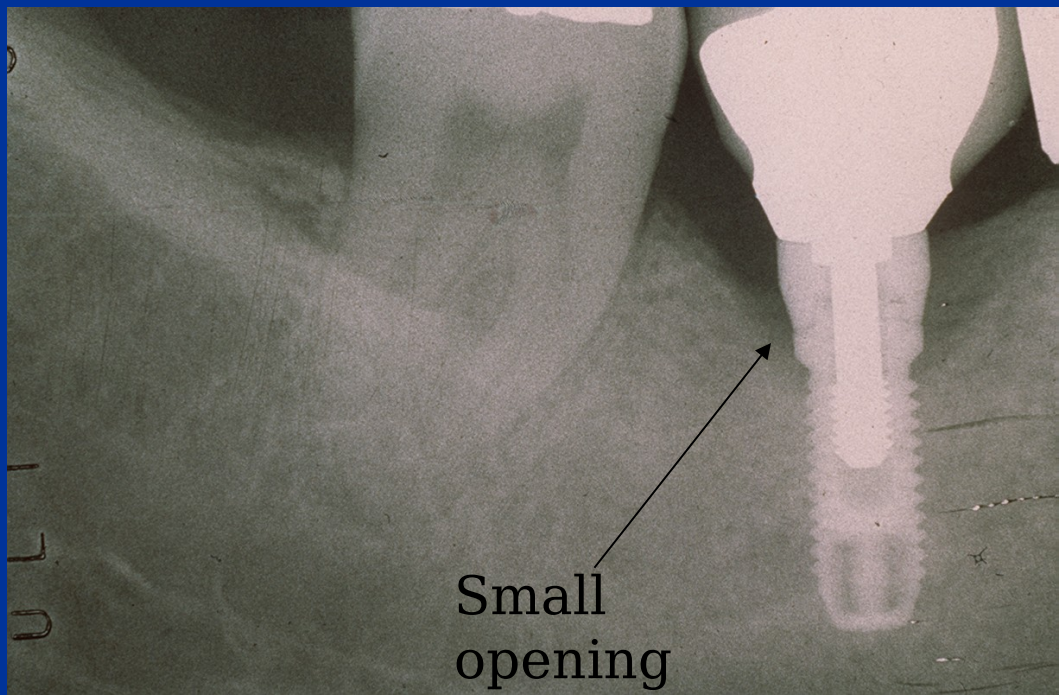
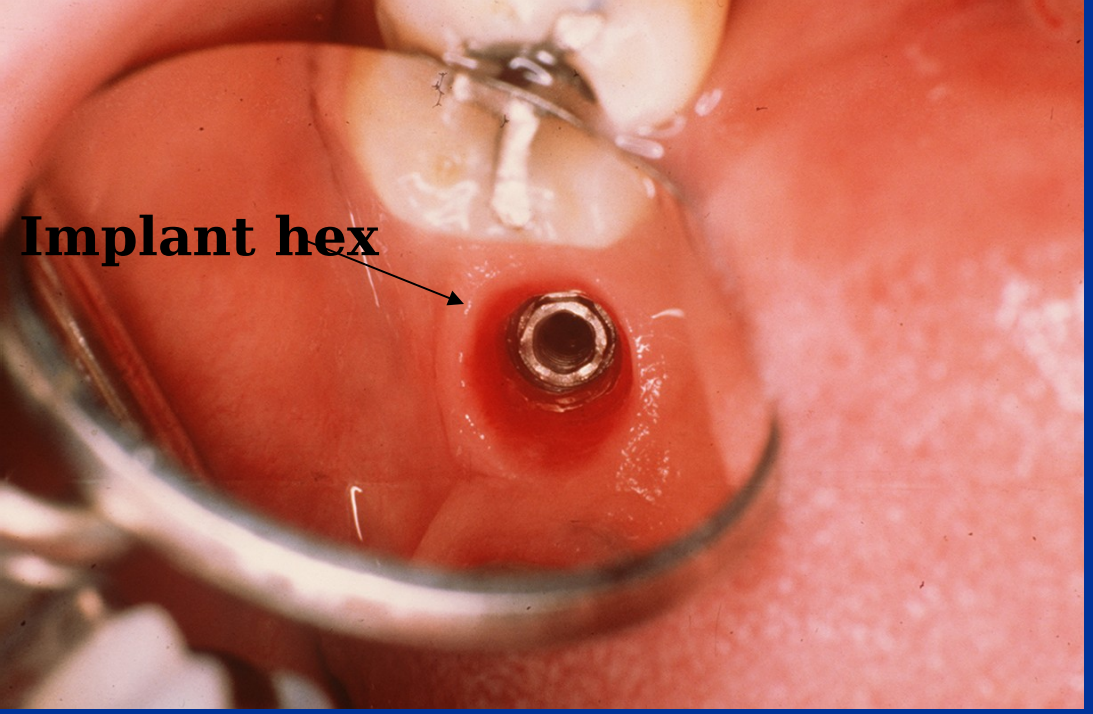




Treatment: continued

2 - inspect the implant hex for damage

3 - inspect the restoration for damage

(A) No Damage to fixture of restoration

4a - replace restoration and secure with the appropriate new screw. Verify seating with radiograph prior to final torque. Recheck occlusion with articulating paper.

(B) Damaged fixture hex and or restoration

4b - replace restoration and secure with same screw. Refer to Command Implant Coordinator.

Fractured Abutment Screw

Treatment Plan:

1 - Remove prosthetic restoration.

2 - Remove fractured abutment.

3 - Remove fractured abutment screw.

- Intraoral fractured abutment screws can often be

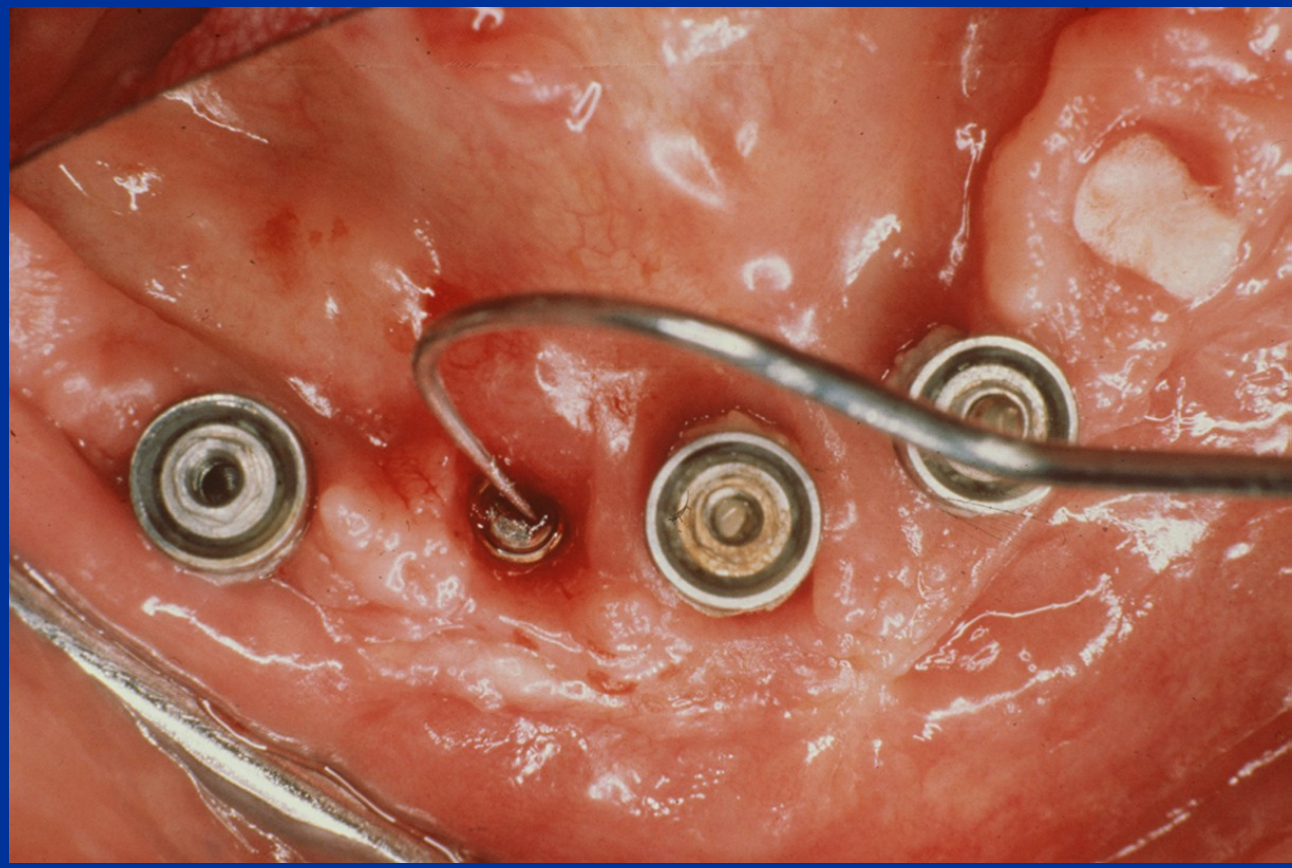
(next slide)

Fractured Abutment Screw

- the tip of the explorer is placed on the top portion of the fractured abutment screw.

- with slight apical pressure and a counterclockwise circular motion, the fragment can often be unscrewed.

- care must be taken (next



Fractured Abutment Screw

Treatment : continued

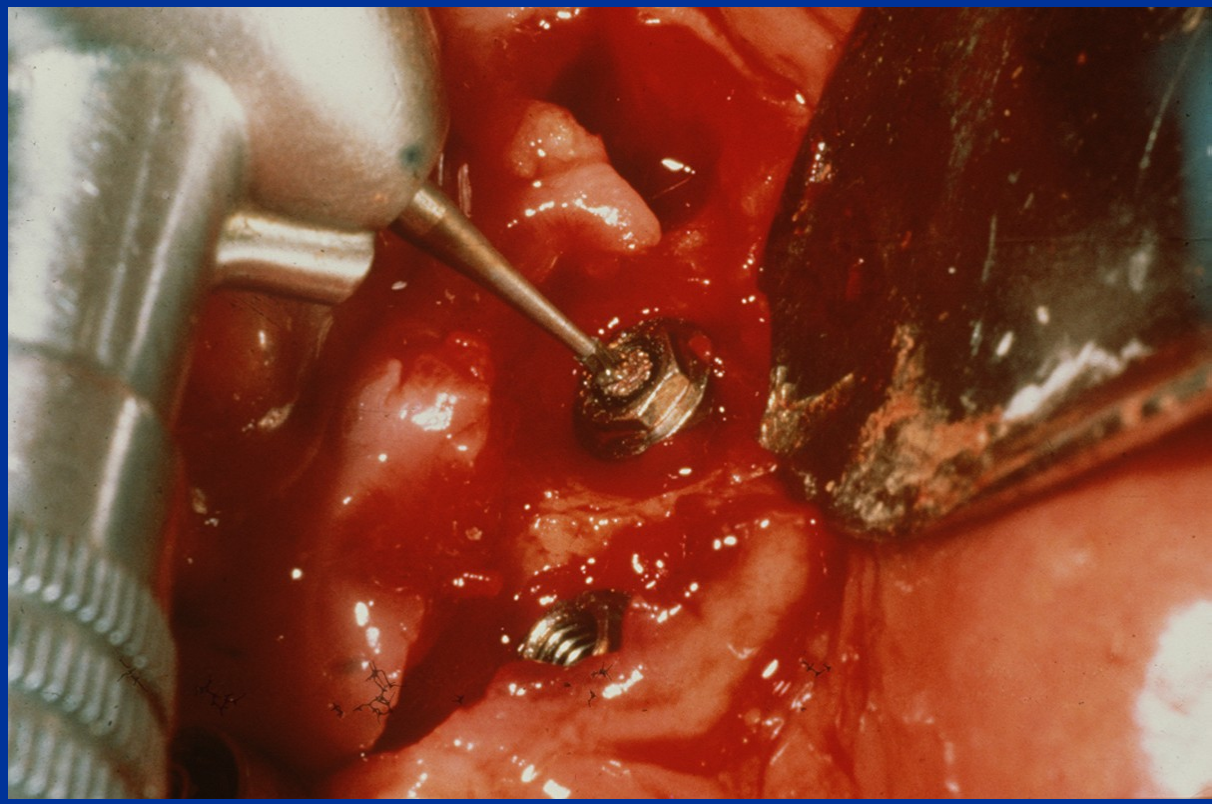
(A) Screw Fragment removed

4a - replace with appropriate new abutment and screw. Verify seating with a radiograph prior to final torque.

5a - replace prosthesis and secure with new retention screws.

(next

- rotary instruments have been used by skilled practitioners utilizing magnification. (not recommended)



Fractured Abutment Screw

(B) Screw fragment unable to be removed

4b - Replace prosthesis on existing abutments and secure with prosthetic retention screws or place healing caps on all abutments. On request Nobel Biocare will send you a tool kit to help retrieve broken abutment screws. (800) 891-9191. Consult the Command Implant Coordinator first.

5b - Refer to Command Implant Coordinator.

Problems in the field

- Fractured/loosened screws
- **Fixture loss**
- Poor oral hygiene
- Soft tissue reactions
- Broken attachments
- Fractured components

Fixture loss

(Must differentiate between “failing” and “failed”)

- **Failing Implant**
  - **Clinical signs:**
    - **progressive bone loss**
    - **soft tissue pocketing and crestal bone loss**
    - **bleeding on probing with possible purulence**
    - **tenderness to percussion or torque forces**
  - **Causes:**
    - **overheating of bone at the time of surgery or lack of initial stability.**
    - **Nonpassive superstructures**
    - **inadequate screw joint closure**
    - **functional overload**
    - **periodontal infection (peri-implantitis)**

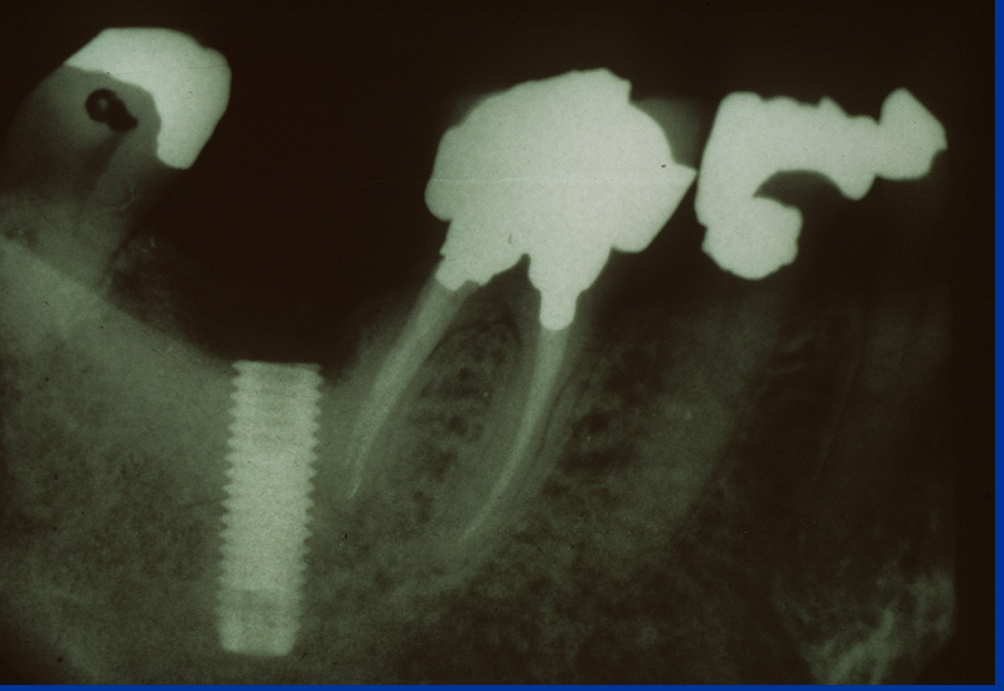
Fixture loss

- **Failing Implant**
  - **Treatment:**
    - **Interim: remove prosthesis and abutments**
      - **irrigate with Peridex**
      - **ultrasonic and disinfect all components**
      - **reinsert assuring proper screw torque**
      - **recheck passive fit of framework and occlusion**

- **Failed Implant**
  - **Clinical signs:**
    - **Mobility**
      - **verify fixture mobility by removing any abutments and superstructures first.**
    - **A “Dull” percussion sound has been associated with a failed implant**
    - **Peri-implant radiolucency can be a radiographic finding**
      - **often this is not evident on an X-ray**

Fixture loss

- **Failed Implant**
  - **Causes**
    - **surgical compromise (overheating bone and initial lack of stability).**
    - **Nonpassive superstructures.**
    - **Inadequate screw joint closure**
    - **Too rapid initial loading**
    - **Functional overload**
    - **Periodontal infection (“peri-implantitis”)**
  - **Treatment**
    - **removal of the implant**



Presentation: Lost restoration

Radiographic evaluation: fractured fixture

Diagnosis: Fractured implant fixture head

Treatment:

1 - refer to Command Implant Coordinator.

Problems in the field

- Fractured/loosened screws
- Fixture loss
- **Poor oral hygiene**
- Soft tissue reactions
- Broken attachments
- Fractured components

Oral Hygiene

- calculus build up can cause areas of soft tissue inflammation.
- may result in progressive bone loss if left untreated.

Treatment

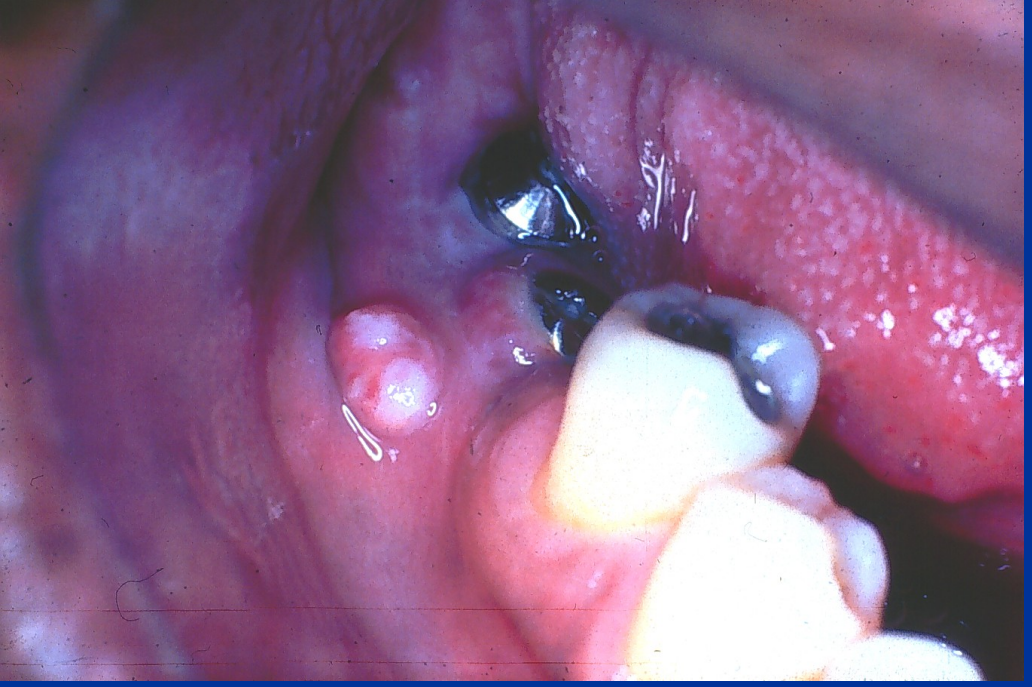
- remove prostheses, check implants for mobility, retorque abutments.
- perform maintenance cleaning on prosthesis and abutments.
- reinsert prosthesis with new screws, give oral hygiene instructions.

Problems in the field

- Fractured/loosened screws
- Fixture loss
- Poor oral hygiene
- **Soft tissue reactions**
- Broken attachments
- Fractured components

Soft tissue reactions

- Often seen with split thickness skin grafts or lack of periabutment keratinized tissue
- Soft tissue inflammation most commonly due to loose screw joints.
  - Remove the offending screws, tighten the abutments and reinsert the prosthesis.
- Poor oral hygiene: soft tissue inflammation often referred to “peri-implantitis”. Etiology similar to natural teeth (plaque, lack of attached tissue, etc.) May result in progressive bone loss.
- Failing or failed implants.



Presentation: Soft tissue reaction

Radiographic evaluation:

(A) Within Normal Limits

Treatment:

1 - Remove abutment

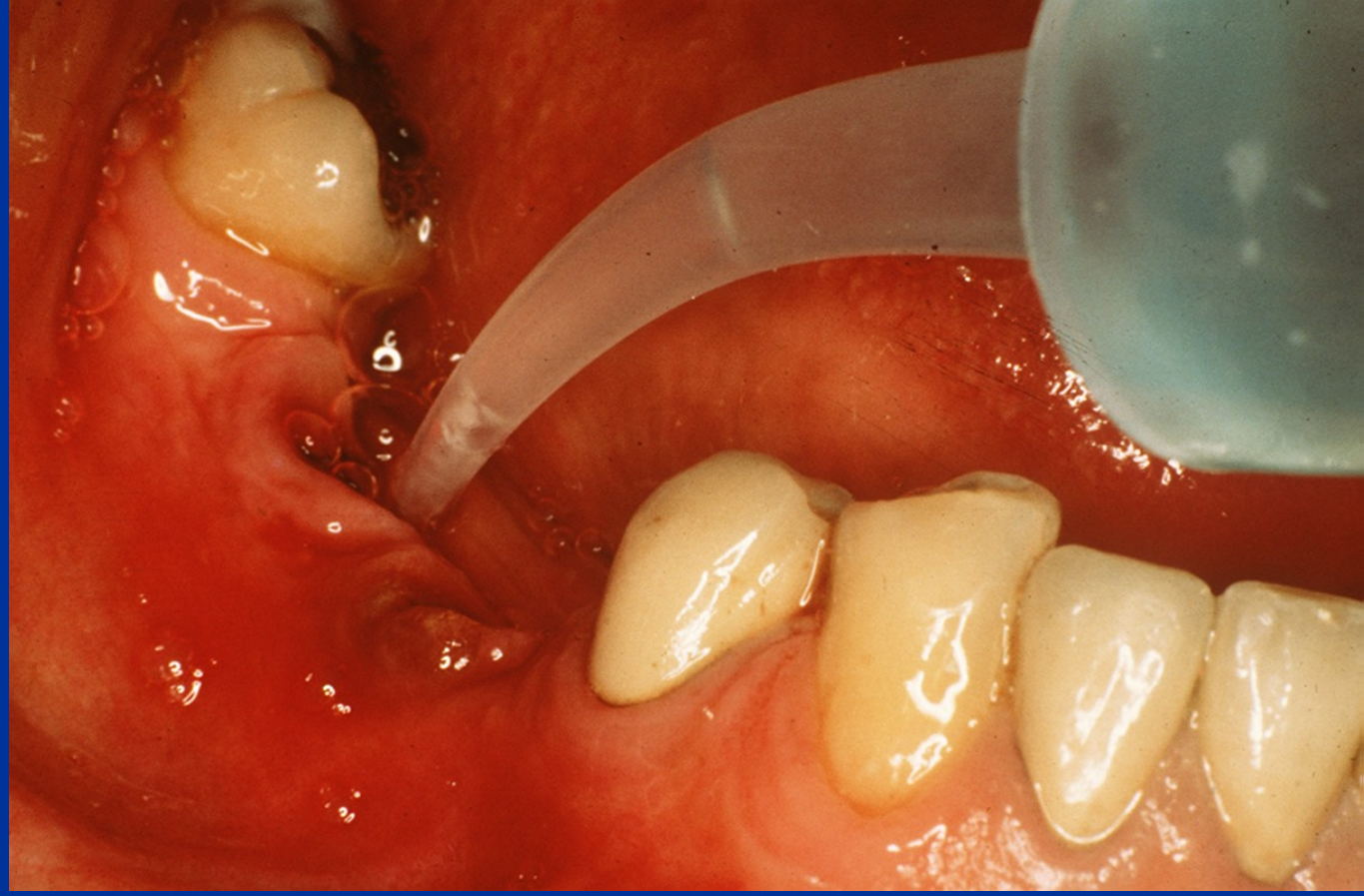
2 - Irrigate area with sterile saline or Peridex (next slide)

(B) Loose or fractured screw

Treatment:

1 - See treatment for loose or fractured screws

Irrigate area with sterile saline or peridex.



Treatment: (cont)

3 - Replace abutment or restoration.

4 - Follow up as needed

Problems in the field

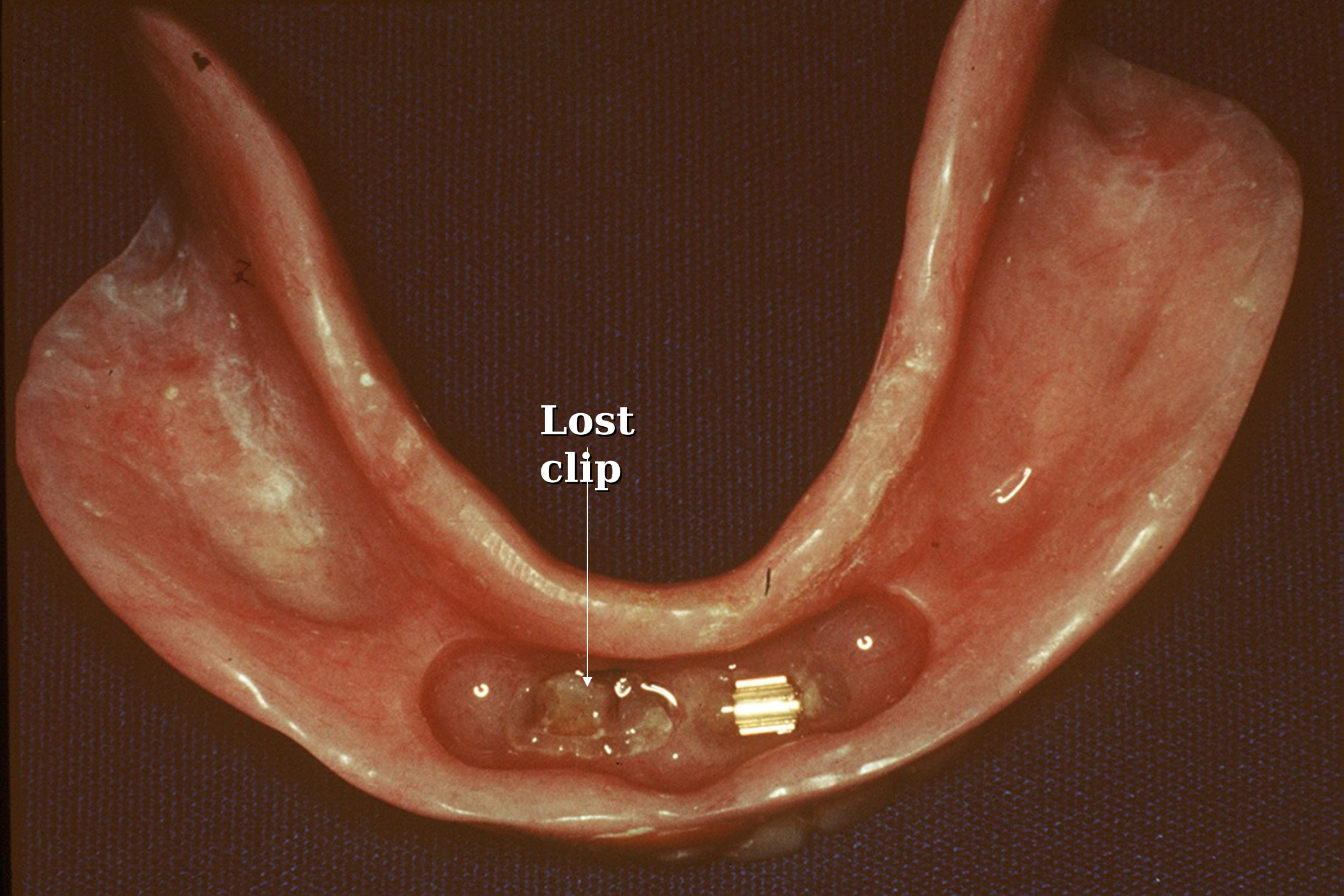
- Fractured/loosened screws
- Fixture loss
- Poor oral hygiene
- Soft tissue reactions
- **Broken attachments**
- Fractured components

Broken Attachments

- **Plastic bar clip**
  - **damaged or broken**
    - **cut along long axis with sharp knife and remove.**
  - **Missing**
    - **replace by inserting a new clip into denture base receptacle**
    - **if unavailable, contact Command Implant Coordinator**
- **Metal bar clip**
  - **damaged or broken (replacement clip available)**
    - **remove the clip and perforate the denture base carefully for intraoral pick up replacement.**
    - **Block out under the bar with wax, seat the denture and position a new clip through access in denture base.**
    - **Use autopolymerizing acrylic resin with "bead brush" technique to fill in access and connect clip to denture base. Polish , disinfect and deliver.**
    - **Always confirm seating of denture after repair and evaluate occlusion.**

Broken Attachments

- **Metal bar clip**
  - Damaged or broken **(replacement clip not available)**
    - remove all remnants of the clip from the denture base.
    - block out under the bar with wax
    - reline the clip area of the denture with a resilient chairside reline material (viscogel).
  - Intact clip with no retention
    - carefully bend the leaves of the clip toward the bar with a thin instrument.
    - Reseat the denture to confirm increased retention.
    - Recheck occlusion.
- **Stud attachments**
  - treatment is similar to clips
    - tease out “O” ring with an explorer and replace as needed.
    - Fractured housing can be treated like a clip replacement.

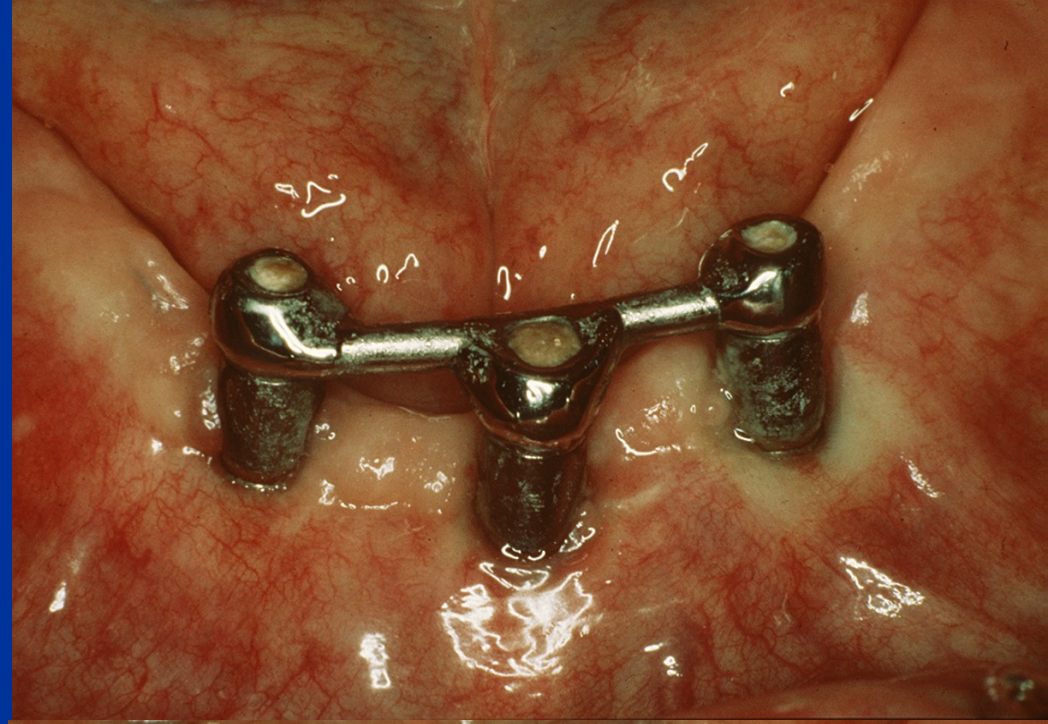

Lost
clip

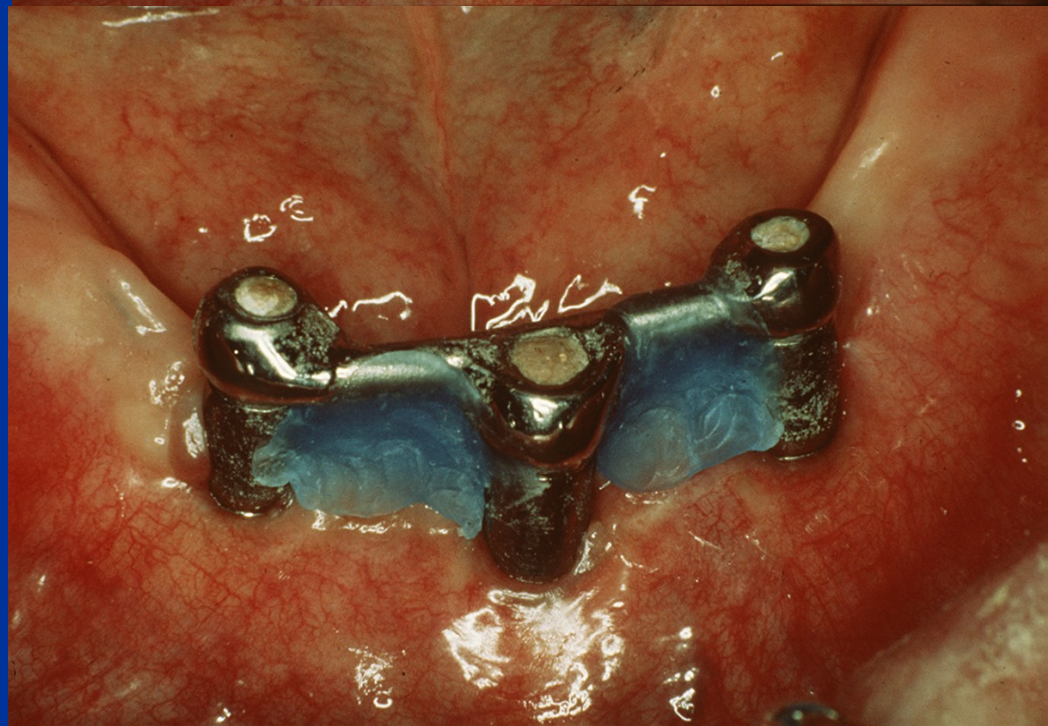
Clip Repair

1 - Block out bar with wax

2 - Remove all remnants of the clip from the denture base.

3 - reline clip area of denture with resilient chairside reline material. (Viscogel)



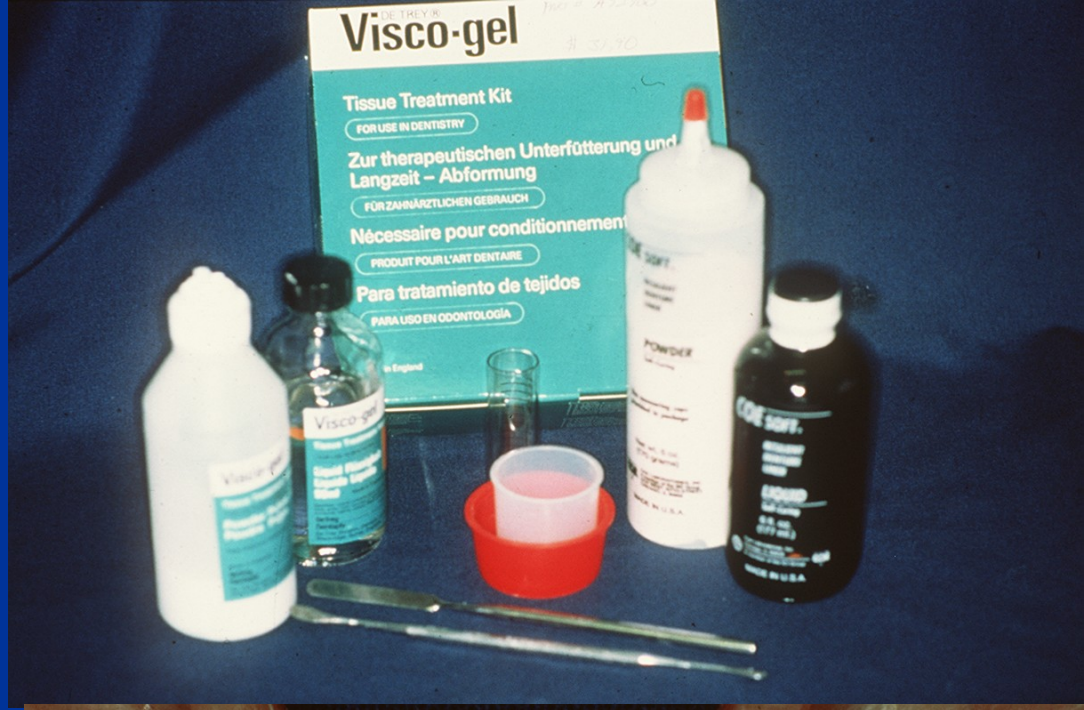


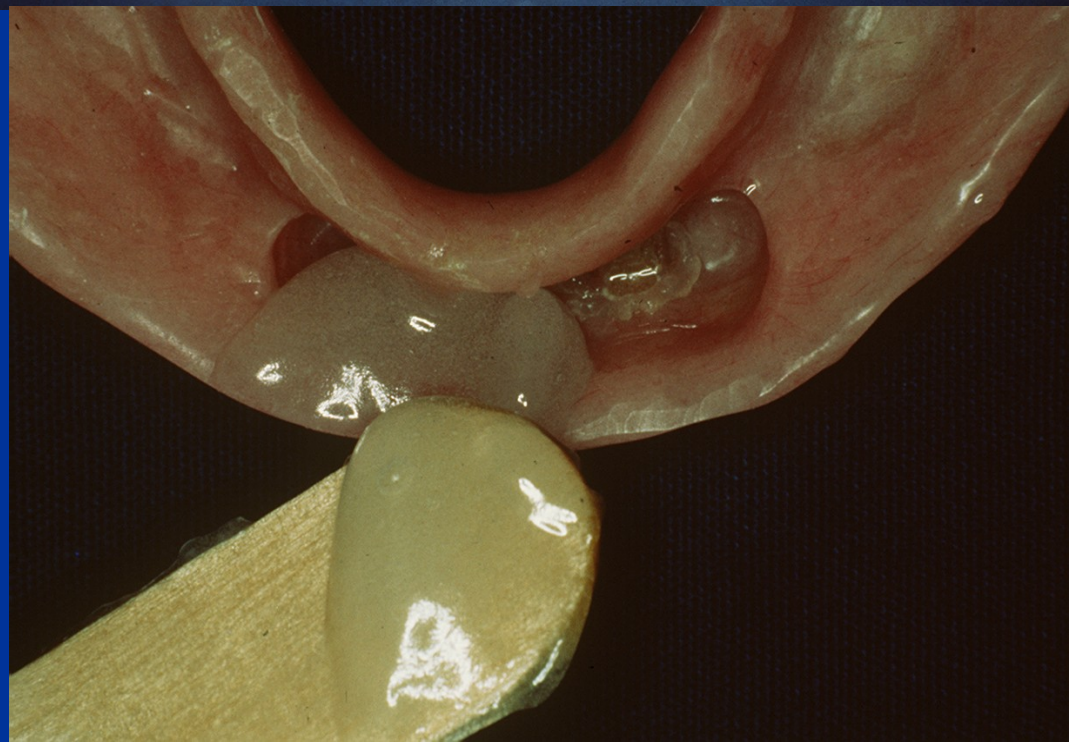
Clip Repair

4 - Reseat prosthesis and verify occlusion.

5 - Remove after 10 to 15 minutes, trim excess material, polish, disinfect and deliver back to patient.

3 - reline clip area of denture with resilient chairside reline material. (Viscogel)





Problems in the field

- Fractured/loosened screws
- Fixture loss
- Poor oral hygiene
- Soft tissue reactions
- Broken attachments
- Fractured components

Fractured components

- **Screw retained prosthesis**
  - **Fractured resin or prosthetic tooth**
    - **remove prosthesis and repair as if a conventional prosthesis.**
    - **If the prosthesis is a hybrid, remove in the same manner as for a maintenance appointment.**
- **Cemented Prosthesis**
  - **Multiple unit restoration**
    - **carefully tap off the restoration with crown remover and repair as indicated.**
  - **Single unit restoration**
    - **if no screw access, drill an access through the occlusal surface to the abutment screw and remove the restoration.**
    - **Repair or fabricate provisional as indicated.**